**PATENT**

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
# BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

**In re Application of:** Kei-Yu Ko et al.

**Serial No.:** 09/711,324

**Filed:** November 13, 2000

**For:** ETCHANT WITH SELECTIVITY FOR DOPED SILICON DIOXIDE OVER UNDOPED SILICON DIOXIDE AND SILICON NITRIDE, PROCESSES WHICH EMPLOY THE ETCHANT, AND STRUCTURES FORMED THEREBY

**Examiner:** K. Chen

**Group Art Unit:** 1765

**Attorney Docket No.:** 3526.4US (97-1136.4)

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## APPEAL BRIEF

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Attention: Board of Patent Appeals and Interferences

Sirs:

This brief is submitted in TRIPLICATE pursuant to 37 C.F.R.§ 1.192(a) and in the format required by 37 C.F.R. § 1.192(c) and with the fee required by 37 C.F.R. § 1.17(c):

(1) REAL PARTY IN INTEREST

The real party in interest to the referenced application is Micron Technology, Inc., a corporation of the State of Delaware, having a place of business at 8000 South Federal Way, Boise, Idaho 83707-0006, the assignee of the entire right, title and interest for the referenced application in the United States and all foreign countries.

(2) RELATED APPEALS AND INTERFERENCES

U.S. Patent application serial no. 09/652,144, filed on July 25, 2000, which is related to the above-referenced application, is currently on appeal.

(3) STATUS OF CLAIMS

Claims 1-38 are currently pending in the above-referenced patent application.

Claims 1-38 stand rejected.

The rejections of claims 1-38 are being appealed.

(4) STATUS OF AMENDMENTS

The last amendment to the claims of the above-referenced patent application, in which it was proposed that claims 19 and 28 be amended, was submitted in an Amendment under 37 C.F.R. § 1.116, filed on September 10, 2001.

In an Advisory Action dated September 21, 2001, the rejections of claims 1-38 were maintained. The Advisory Action indicates that, upon filing of a Notice of Appeal and an Appeal

Brief in the above-referenced application, the claim amendments proposed in the Amendment filed on September 10, 2001, are to be entered.

A Notice of Appeal in the referenced application was filed on September 28, 2001.

## (5) SUMMARY OF THE INVENTION

The above-referenced application discloses, among other things, a dry etchant that is useful for etching or patterning a structure that includes doped silicon dioxide with selectivity over both undoped silicon dioxide and silicon nitride. The dry etchant comprises a component with the general formula $C_2H_xF_y$, where x is an integer from 3 to 5, inclusive, y is an integer from 1 to 3, inclusive, and $x + y = 6$. The dry etchant is formulated to etch doped silicon dioxide at a faster rate than both undoped silicon dioxide and silicon nitride. Thus, either of these materials may be used as an etch stop adjacent a doped silicon dioxide structure.

## (6) ISSUE

Whether claims 1-38 are patentable under 35 U.S.C. § 103(a) over United States Patent 5,626,716 to Bosch et al. (hereinafter "Bosch") in view of United States Patent 5,814,563 to Ding et al. (hereinafter "Ding").

(7) GROUPING OF CLAIMS

Claims 1-38 should be grouped together. Claim 20 recites subject matter that is representative of that recited by all of the claims in this group. Each of claims 1-19 and 21-38 stands and falls with claim 20.

(8) ARGUMENT

Under 35 U.S.C. § 103(a), claims 1-38 are patentable over Bosch in view of Ding.

(A) Authorities Relied Upon

To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The mere fact that references can be combined or modified does not render the resulting combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

It is improper to combine references where the references teach away from their combination. MPEP § 2145 (citing *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983)). Further, a prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

(B) Summary of Cited Prior Art

Bosch teaches a dry etch process in which a chemical combination that includes $CHF_3$ (Freon-23) and neon (Ne) is used to remove doped silicon oxide with selectivity over undoped silicon oxide, silicon nitride, silicide, and silicon. *See, e.g.*, col. 2, lines 34-44. Any of these materials may, therefore, be used as an etch stop when a doped silicon oxide is being dry etched with the disclosed combination of $CHF_3$ and Ne. *See, e.g.*, col. 4, lines 43-48. Bosch does not disclose, teach, or suggest any dry etchant chemical combination that includes $C_2H_xF_y$, where x is an integer from three to five, inclusive, y is an integer from one to three, inclusive, and $x + y = 6$. Nor does Bosch disclose, teach, or suggest that any such dry etchant chemical combination may be used to dry etch doped silicon oxide with selectivity over undoped silicon oxide or even that doped silicon oxide may be dry etched with such a chemical combination.

Ding teaches, among other things, a dry etch process in which a chemical combination that includes a fluorocarbon gas, an ammonia-generating ($NH_3$-generating) gas, and a carbon-oxygen gas is used to dry etch dielectric materials such as doped and undoped silicon dioxide. *See, e.g.*, col. 2, lines 32-43. Ding also teaches that, by use of the chemical combination disclosed therein, dielectric

materials, such as doped and undoped silicon oxides, may be removed with selectivity over underlying substrate materials, such as silicon or gallium arsenide. *See, e.g.,* col. 3, lines 49-54. Ding further provides that the dry etchant chemical combination etches dielectric materials with selectivity over both photoresist materials and polysilicon. Col. 7., lines 44-49. Among the various fluorocarbons that are specifically disclosed in Ding as being useful in the chemical combination are $CHF_3$ and $C_2H_4F_2$. *See, e.g.,* col. 2, line 62, to col. 3, line 2. Ding does not, however, disclose, teach, or suggest that the chemical combination disclosed therein or any other dry etchant chemical combination that includes $C_2H_4F_2$ may be used to dry etch doped silicon oxide with selectivity over undoped silicon oxide.

(C) Arguments for Patentability of Claims 1-38

It is respectfully submitted that a *prima facie* case as to the obviousness of claims 1-38 under 35 U.S.C. § 103(a) over Bosch in view of Ding has not been established for several reasons.

*One of Ordinary Skill in the Art Would Not Have Been Motivated to Make the Proposed Combination*

First, it is respectfully submitted that, based solely on the teachings of Bosch, Ding, and the knowledge that was generally available to those of skill in the art at the priority date for the above-referenced application, one of ordinary skill in the art would not have been motivated to use an etchant comprising $C_2H_xF_y$, where x is an integer from three to five, inclusive, y is an integer from one to three, inclusive, and $x + y = 6$, as a component of a dry etchant that is formulated to etch doped silicon dioxide with selectivity over at least undoped silicon dioxide.

M.P.E.P. § 2142 provides:

> The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. 'To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or **the examiner must present a convincing line of reasoning** as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references,' *Ex parte Clapp,* 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985) (Emphasis supplied). . .

Thus, the Office's burden of setting forth a *prima facie* case of obviousness is substantial.

M.P.E.P. § 2142 further provides:

> When the motivation to combine the teachings of the references is not immediately apparent, **it is the duty of the examiner to explain why the combination of teachings is proper**. *Ex parte Skinner,* 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986) (Emphasis supplied).

It is respectfully submitted that, despite the directive to provide a convincing line of reasoning, no such reasoning has been provided to support the assertion that one of ordinary skill in the art would have been motivated by Bosch, Ding, or the teachings that were generally available in the art before the priority date for the above-referenced application to combine the teachings of Ding and Bosch in the manner asserted in the outstanding Office Action. Rather, page 2 of the Final Office Action states broadly, and without reasoned support, that because Ding includes $CHF_3$ and $C_2H_4F_2$ in the same list, these materials "are equivalent, containing similar etching characteristics," and that "substitution of one for the other for etching dielectric layer[s] would have . . . produce[d] an expected result."

While Ding teaches that $CHF_3$ and $C_2H_4F_2$ may be used in dry etchant chemical combinations that are useful for etching both doped silicon dioxide and undoped silicon dioxide, Bosch teaches

that dry etchant combinations that include $CHF_3$ *and* Neon etch doped silicon dioxide with selectivity over undoped silicon dioxide. Thus, when the teachings of Bosch and Ding are read together, it appears that it is not the $CHF_3$ in the dry etchant chemical combination of Bosch that provides the selectivity for doped silicon dioxide over undoped silicon dioxide, but rather the inclusion of Neon in a dry etchant chemical combination that also includes $CHF_3$.

Furthermore, it is widely recognized in the art that, without undue experimentation, one of ordinary skill in the art could not readily determine whether or not two fluorocarbons, such as $CHF_3$ and $C_2F_xH_y$, are equivalent with respect to their utility in dry etching doped silicon nitride with selectivity over undoped silicon dioxide. In fact, Bosch notes that "elaborate theories have been developed to explain the plasma etching process, in practice most such processes have been developed largely by experimentation involving **trial and error . . . such experimentation can be time consuming** and success often depends on chance." Col. 1, lines 63-67; col. 2, lines 1-5 (emphasis supplied). In further support of the fact that it would not have been obvious to one of ordinary skill in the art that $CHF_3$ and $C_2F_xH_y$ would have equivalent dry etching properties, at least with respect to the abilities of these materials to dry etch doped silicon dioxide with selectivity over undoped silicon dioxide, Ding observes, "although the reaction mechanism is not fully understood it is believed that the following reaction mechanism provides increased etch rates and higher etching selectivity." Col. 6, lines 16-19. Despite both of these references acknowledging that the underlying mechanisms of plasma etching are not known, an assertion has been made, without supporting motivation or teachings from the prior art references, that the use of $C_2F_xH_y$, where x is an integer from three to five, y is an integer from one to three, and $x + y = 6$ is an obvious substitution of a

known equivalent structure with respect to dry etching doped silicon dioxide with selectivity over undoped silicon dioxide.

Assuming, *arguendo,* that *all* fluorocarbon compounds have the same properties, in this case the ability to etch doped silicon dioxide with selectivity over undoped silicon dioxide or silicon nitride, some evidence must be available to show that a fluorocarbon-containing dry etchant or dry etchant chemical combination other than the $CHF_3$ and Neon combination described in Bosch could be used alone or with other chemicals to etch doped silicon dioxide with selectivity over undoped silicon dioxide. Nonetheless, no such evidence has been provided.

Moreover, it is well known in the art that different members of general groups of compounds, such as the large group of fluorocarbon compounds, may have very different properties. The group of fluorohydrocarbon gases is a very large group of various chemical genuses and species and, by name, indicates that the members thereof need only include carbon atoms, fluorine atoms, and hydrogen atoms. The broad group of fluorohydrocarbon gases includes smaller genuses, or subgroups, including fluoromethanes and fluoroethanes. $CHF_3$ is a member of the fluoromethane group, while the $C_2F_xH_y$'s with $x + y = 6$ are each members of the heavier, fluoroethane group.

The utility of $CHF_3$, a fluoromethane, is well known in the art to be useful with Neon or other components of a dry etchant chemical combination to etch doped silicon dioxide with some selectivity over undoped silicon dioxide. No support has been provided, however, for the assertion that $CHF_3$ would alone be useful for etching doped silicon dioxide at a faster rate than or with selectivity over undoped silicon dioxide. Nor has any support been provided for the assertion that one of ordinary skill in the art would have been motivated to use any $C_2F_xH_y$, where x is an integer

from three to five, y is an integer from one to three, and $x + y = 6$, or fluoroethane, as a dry etchant or in a dry etchant chemical combination that etches doped silicon dioxide at a faster rate than or with selectivity over undoped silicon dioxide. In addition, no support has been provided for the assertion that one of ordinary skill in the art would have been motivated to use $C_2F_xH_y$ of the type recited in the pending claims as a dry etchant for doped silicon dioxide.

Thus, it has not been shown that $C_2F_xH_y$, where x is an integer from three to five, y is an integer from one to three, and $x + y = 6$, is a known equivalent of $CHF_3$ with respect to the dry etching characteristics of these materials.

It is, therefore, respectfully submitted that no convincing line of reasoning has been set forth for combining the teachings of Bosch and Ding to render obvious the subject matter recited in independent claims 1 and 20 of the above-referenced application.

It is also respectfully submitted that the assertion that *any* fluorocarbon compound could meet the limitations of the pending claims does not itself qualify as an explanation of why the combination of Bosch and Ding is proper or why one or ordinary skill in the art would somehow have been motivated to combine Bosch and Ding in the manner that has been asserted. Again, such an explanation should have been based on some evidence in support of the assertion that *any* fluorocarbon compound could be formulated to contain the same properties as those of the $CHF_3$-containing chemical combination disclosed in Bosch.

There are at least several additional reasons that one of ordinary skill in the art would not have been motivated to replace the $CHF_3$ of Bosch's $CHF_3$-Neon etchant system with the $C_2H_4F_2$ of Ding to create a dry etchant that would remove doped silicon dioxide with selectivity over at least

undoped silicon dioxide. First, the etchant system disclosed in Bosch purportedly achieved the desired result: etching doped silicon oxides with selectivity over undoped silicon oxides, so there would be no motivation to modify the system as disclosed. Second, the selectivities of the etchant systems that are respectively disclosed in Bosch and Ding are very different. While Bosch teaches an etchant system that requires both $CHF_3$ and Neon to dry etch doped silicon oxides at a faster rate than or with selectivity over undoped silicon dioxides, Ding discloses etchant systems that include materials such as $CHF_3$ and $C_2H_4F_2$ that are useful for etching dielectric materials, including *both* doped and undoped silicon oxides, with selectivity over photoresist materials and over polysilicon. Third, the etchant systems of both Bosch and Ding require the use of additional components, none of which are common to both references. For example, Bosch teaches that the use of neon along with $CHF_3$ provides the desired selectivity for doped silicon oxides over undoped silicon oxides and other materials, *see* Bosch, col. 2, lines 34-44, while Ding teaches that the use of a dry etchant system including one of the listed fluorocarbons (*e.g.*, $CHF_3$ or $C_2H_4F_2$), an ammonia-generating gas, and a carbon-oxygen gas is useful for etching dielectric materials, including both doped and undoped silicon oxides, with selectivity over photoresist materials and polysilicon.

The disclosed use of $CHF_3$ as a possible component of both the etchant system of Ding and the etchant system of Bosch does not provide the motivation to combine the teachings of Ding and Bosch in the manner that has been suggested in the outstanding Office Action. In fact, Bosch itself warns against reading any such motivation into the references by disclosing, at col. 1, line 57, to col. 2, line 5, that, although many different gaseous media have been used in dry etching, successful use of etchants or etchant combinations to achieve a desired result often depends on

*chance* due to the number of variables involved, including the materials to be etched, the selectivity, and the degree of anisotropy.

For these reasons, it is respectfully submitted that one of ordinary skill would not have been motivated by the teachings of either Bosch or Ding, or by the knowledge generally available to those of ordinary skill in the art before the priority date of the referenced application, to replace $CHF_3$, a component of an etchant system that was known to provide the desired selectivity result, with $C_2H_4F_2$, a different chemical that had previously been used in a system which did not provide selectivity for doped silicon dioxides over undoped silicon dioxides or for an increased etch rate of doped silicon dioxides relative to the etch rate of undoped silicon dioxides.

*There Is No Reasonable Expectation that the Proposed Combination Would Be Successful*

Second, it is respectfully submitted that there is no reasonable expectation that the combination of Ding and Bosch would be successful.

In particular, for the reasons provided above, no support has been provided to demonstrate that $C_2F_xH_y$, where x is an integer from three to five, y is an integer from one to three, and $x + y = 6$, or fluoroethane, would be useful as either a dry etchant or in a dry etchant chemical combination to etch doped silicon dioxide, let alone to etch doped silicon dioxide with selectivity over undoped silicon dioxide. Nor has any support been provided for the assertion that the $C_2H_4F_2$ of Ding, with or without Neon, could be used as a dry etchant or in a dry etchant chemical combination that removes undoped silicon dioxide at a faster rate than or with selectivity over undoped silicon dioxide. Thus, there is no basis for one of ordinary skill in the art to reasonably expect that a dry

etchant including the $C_2H_4F_2$ of Ding could be formulated to etch doped silicon dioxide with selectivity over at least undoped silicon dioxide.

Moreover, as indicated at col. 1, line 57, to col. 2, line 5, of Bosch, the successful use of etchants or etchant combinations to achieve a desired result–in this case the ability to etch doped silicon dioxide with selectivity over at least undoped silicon dioxide–depends on chance. As M.P.E.P. § 2141.02 requires that each prior art reference used in a claim rejection must be considered in its entirety, it is respectfully submitted that the Bosch's indication of the chance involved must be read as indicating that one of ordinary skill in the art could not reasonably expect that a dry etchant including the $C_2H_4F_2$ of Ding in place of the $CHF_3$ of Bosch to etch doped silicon dioxide with selectivity over at least undoped silicon dioxide.

Moreover, as none of claims 1-38 requires that the dry etchant include Neon to provide the stated selectivity (claim 1) or relative etch rates (claim 20), it is respectfully submitted that Ding's teaches away from the invention recited in independent claims 1 and 20 by teaching that $CHF_3$, $C_2H_4F_2$, and the other listed fluorocarbon dry etchants are able to etch both doped and undoped silicon dioxides.

*The Relied-Upon References Teach Away from the Proposed Combination*

Third, it is respectfully submitted that Bosch and Ding teach away from the proposed combination thereof. Specifically, the chemical combination disclosed in Bosch is useful for etching doped silicon dioxide with selectivity over undoped silicon dioxide. Conversely, Ding teaches, at col. 3, lines 57-61, that the chemical combinations disclosed therein, which may, among other

components, include $C_2H_4F_2$, are useful for etching *both* doped silicon dioxide (BPSG) and undoped silicon dioxide. Thus, Ding teaches away from the asserted substitution of the $CHF_3$ disclosed in Bosch with the $C_2H_4F_2$ disclosed in Ding to provide a chemical combination that will etch doped silicon dioxide with selectivity over undoped silicon dioxide.

*The Relied-Upon References Do Not Teach or Suggest Each and Every Claim Element*

Fourth, it is respectfully submitted that, when taken either alone or in combination, Bosch and Ding do not teach or suggest each and every element of any of claims 1-38.

Independent claim 1 recites a dry etchant that etches doped silicon dioxide with selectivity over undoped silicon dioxide. The dry etchant of claim 1 includes a component with the general formula $C_2H_xF_y$, where x is an integer from 3 to 5, inclusive, y is an integer from 1 to 3, inclusive, and $x + y = 6$.

Independent claim 20 recites a dry etchant that etches doped silicon dioxide at a faster rate than it etches undoped silicon dioxide. The dry etchant of claim 20 includes a component with the general formula $C_2H_xF_y$, where x is an integer from 3 to 5, inclusive, y is an integer from 1 to 3, inclusive, and $x + y = 6$.

The common subject matter recited in both independent claim 1 and independent claim 20 includes a component of a dry etchant with the general formula $C_2H_xF_y$, where x is an integer from 3 to 5, inclusive, y is an integer from 1 to 3, inclusive, and $x + y = 6$, and that the rate at which the dry etchant removes doped silicon dioxide is faster than the rate at which the dry etchant removes undoped silicon dioxide.

Neither Bosch nor Ding, taken either alone or in combination, teaches that an etchant comprising $C_2H_xF_y$, where x is an integer from 3 to 5, inclusive, y is an integer from 1 to 3, inclusive, and $x + y = 6$, may be used to dry etch doped silicon dioxide with selectivity over undoped silicon dioxide, as is recited in both independent claim 1 and independent claim 20.

Claims 2-19 and 21-38 are each allowable, among other reasons, as depending either directly or indirectly from claims 1 and 20, respectively.

In view of the foregoing, it is respectfully submitted a *prima facie* case that the teachings of Ding and Bosch could be combined under 35 U.S.C. § 103(a) to render obvious the subject matter recited in any of claims 1-13 and 18-27 has not been set forth. It is, therefore, submitted that each of claims 1-38 is allowable under 35 U.S.C. § 103(a). Accordingly, reversal of the 35 U.S.C. § 103(a) rejection of claims 1-38 is respectfully requested.

(9) <u>APPENDICES</u>

A copy of claims 1-38 is appended hereto as "Appendix A."

(10) CONCLUSION

It is respectfully submitted that a *prima facie* case as to the obviousness of claims 1-38 has not been established under 35 U.S.C. § 103(a). Therefore, it is respectfully requested that the Board reverse the rejections of claims 1-38 as being unpatentable under 35 U.S.C. § 103(a).

Respectfully submitted,

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## APPENDIX A

1. A dry etchant, comprising a component with the general formula $C_2H_xF_y$, where x is an integer from 3 to 5, inclusive, y is an integer from 1 to 3, inclusive, and $x + y = 6$, said dry etchant being formulated to etch doped silicon dioxide with selectivity over at least undoped silicon dioxide.

2. The dry etchant of claim 1, also being formulated to etch doped silicon dioxide with selectivity over silicon nitride.

3. The dry etchant of claim 1, including a combination of components.

4. The dry etchant of claim 3, wherein said component is a primary etchant.

5. The dry etchant of claim 4, further comprising an additive.

6. The dry etchant of claim 5, wherein said additive comprises a halogenated carbon dry etchant material.

7. The dry etchant of claim 5, wherein said additive comprises a fluorocarbon having at least as many hydrogen atoms as fluorine atoms.

8. The dry etchant of claim 7, wherein said fluorocarbon comprises at least one of $CH_2F_2$ and $CH_3F$.

9. The dry etchant of claim 5, wherein said additive comprises at least one of $CF_4$ and $CHF_3$.

10. The dry etchant of claim 4, wherein said additive increases a rate with which said dry etchant etches doped silicon dioxide over a rate at which said component alone etches doped silicon dioxide.

11. The dry etchant of claim 10, wherein said additive comprises at least one of $CF_4$ and $CHF_3$.

12. The dry etchant of claim 4, wherein said additive increases a selectivity with which said dry etchant etches doped silicon oxide over at least undoped silicon dioxide over said selectivity of said component alone.

13. The dry etchant of claim 12, wherein said additive comprises at least one of $CH_2F_2$ and $CH_3F$.

14. The dry etchant of claim 4, wherein said additive increases a selectivity of said dry etchant for one type of doped silicon dioxide over another type of silicon dioxide over said selectivity of said component alone.

15. The dry etchant of claim 3, wherein said component comprises an additive for use with another, primary etchant.

16. The dry etchant of claim 15, wherein said primary etchant comprises at least one of $CF_4$ and $CHF_3$.

17. The dry etchant of claim 15, wherein said combination of said component and said primary etchant etches doped silicon dioxide with greater selectivity over at least undoped silicon dioxide than a selectively of said primary etchant alone.

18. The dry etchant of claim 15, wherein said combination of said component and said primary etchant etches doped silicon dioxide at a substantially normal rate.

19. (Amended) The dry etchant of claim 3, wherein relative concentrations of said component and said primary etchant in said combination are tailored to provide for at least one of a particular etch selectivity of doped silicon dioxide over undoped silicon dioxide, a particular etch selectivity of doped silicon dioxide over silicon nitride, and a particular etch rate of doped silicon dioxide.

20. A dry etchant comprising a component with the general formula $C_2H_xF_y$, where x is an integer from 3 to 5, inclusive, y is an integer from 1 to 3, inclusive, and $x + y = 6$, said dry etchant being formulated to etch doped silicon dioxide at a faster rate than at least undoped silicon dioxide.

21. The dry etchant of claim 20, also being formulated to etch doped silicon dioxide at a faster rate than silicon nitride.

22. The dry etchant of claim 20, including a combination of components.

23. The dry etchant of claim 22, wherein said component is a primary etchant.

24. The dry etchant of claim 23, further comprising an additive.

25. The dry etchant of claim 24, wherein said additive comprises a halogenated carbon dry etchant material.

26. The dry etchant of claim 24, wherein said additive comprises a fluorocarbon having at least as many hydrogen atoms as fluorine atoms.

27. The dry etchant of claim 26, wherein said fluorocarbon comprises at least one of $CH_2F_2$ and $CH_3F$.

28. The dry etchant of claim 24, wherein said additive comprises at least one of $CF_4$ and $CHF_3$.

29. The dry etchant of claim 23, wherein said additive increases a rate with which said dry etchant etches doped silicon dioxide over a rate at which said component alone etches doped silicon dioxide.

30. The dry etchant of claim 29, wherein said additive comprises at least one of $CF_4$ and $CHF_3$.

31. The dry etchant of claim 23, wherein said additive increases a selectivity with which said dry etchant etches doped silicon oxide over at least undoped silicon dioxide over said selectivity of said component alone.

32. The dry etchant of claim 31, wherein said additive comprises at least one of $CH_2F_2$ and $CH_3F$.

33. The dry etchant of claim 23, wherein said additive increases a selectivity of said dry etchant for one type of doped silicon dioxide over another type of silicon dioxide over said selectivity of said component alone.

34. The dry etchant of claim 22, wherein said component comprises an additive for use with another, primary etchant.

35. The dry etchant of claim 34, wherein said primary etchant comprises at least one of $CF_4$ and $CHF_3$.

36. The dry etchant of claim 34, wherein said combination of said component and said primary etchant etches doped silicon dioxide with greater selectivity over at least undoped silicon dioxide than a selectively of said primary etchant alone.

37. The dry etchant of claim 34, wherein said combination of said component and said primary etchant etches doped silicon dioxide at a substantially normal rate.

38. (Twice amended) The dry etchant of claim 22, wherein relative concentrations of said component and said primary etchant in said combination are tailored to provide for at least one of a particular etch selectivity of doped silicon dioxide over undoped silicon dioxide, a particular etch selectivity of doped silicon dioxide over silicon nitride, and a particular etch rate of doped silicon dioxide.